lifting surface of about 200 square feet, lifted 29,000 feet of wire weighing 75 pounds, and the meteorograph recording barometric pressure, air temperature and relative humidity, and wind velocity to the height of 11,444 feet above the hill. A maximum wind velocity of 40 miles an hour was encountered at a height of 11,000 feet, the surface wind being 22 miles an hour. The temperature at the highest point reached was 38° and the air was very dry, while at the ground at the same time the temperature of the air was 75° and its relative humidity 60 per cent. In September, 1897, the meteorograph was twice maintained at the nearly uniform height of 1,700 feet during the greater portion of twenty-four hours and flights were made on seven consecutive days. A discussion, by Mr. Clayton, of these records has been published as Bulletin No. 2 of the observatory under the title: Examples of the Diurnal and Cyclonic Changes of Temperature and Relative Humidity at Different Heights in the Free Air. In July, 1898, a practically continuous record at a greater altitude was obtained during a day and a night. Kites are frequently employed at Blue Hill to measure the heights of the lower surfaces of certain low and uniform clouds which could not be measured by either photographic or visual theodolites. By the traces of the barometer and hygrometer the thickness of clouds may be determined.

In conclusion, it may be affirmed that the Blue Hill experiments have demonstrated the possibilities of kites for the meteorological study of the free air up to a height of at least 2 miles above the earth.[1] The reasons for the superiority of kites over balloons, whenever there is wind, are stated by me in the Strassburg Aeronautische Mittheilungen for April, 1898. At the meeting of the International Aeronautical Committee in Strassburg last April I had the honor to present a report on the subject. The conference recommended that all the central observatories employ this method of investigation as being of prime importance for meteorology. (See MONTHLY WEATHER REVIEW, April, 1898.) At the present time kites are so employed at stations of the United States Weather Bureau, at St. Petersburg, and near Paris. Experiments with kites to obtain meteorological data are also being made in Scotland, the birth place of scientific kite flying, and a similar use of kites is proposed at some of the mountain meteorological stations on the continent of Europe, at the Deutsche Seewarte in Hamburg, and at the Prussian Meteorogical Institute in Berlin.

PROF. PARK MORRILL.

By Prof. E. B. GARRIOTT.

Park Morrill, Professor of Meteorology, United States Weather Bureau, died August 7, 1898, of typhoid fever, after an illness of three weeks.

Professor Morrill was born in Malden, Ill., in 1860; was graduated from Amherst College in 1881, and enlisted in the United States Signal Corps January 6, 1882. He was assigned to the Baltimore station of the Signal Service, August 8, 1882, for the purpose of pursuing a course of study at Johns Hopkins University for "the acquirement of an experimental and theoretical knowledge of those branches of physics that relate to meteorology, especially heat and electricity."

During the period of his assignment at Baltimore he was promoted to the rank of sergeant, to date July 12, 1885, and his detail at that place was terminated September 5, 1887. While serving as assistant at Boston, Mass., Mr. Morrill was ordered to assume charge of the Signal Service exhibit at the Paris Exposition, and in the performance of this duty he remained in Paris from March 25 to December 2, 1889. At the close of the exposition he returned to the Boston station. On July 1, 1891, he was appointed an observer in the Weather Bureau, and on October 2, 1891, was made local forecast official and placed in charge of the station at Atlanta, Ga., where he remained until September, 1894, when he was transferred to the Central Office, at Washington, for duty as forecast official, to which position he was appointed September 15, 1894. On July 16, 1898, he was made a professor of meteorology in the Weather Bureau and assigned to the charge of the establisment of the West Indian Weather Service.

Possessed of rare mental attainments which were developed by a college training, and ripened by five years of special study and investigation, Professor Morrill was eminently well equipped for a most useful and even brilliant career in his chosen field of work.

His ability and zeal in prosecuting work of a congenial nature was exemplified in the last year of his life. His work, Floods of the Mississippi, will long be considered a standard book of reference, and he will, for all time, be recognized as one of the first active workers in the organization of the West Indian Weather Service, a service which promises to prove of incalculable value to the maritime interests of the United States, the West Indies, and Central America.

Of a disposition generous and genial, he was beloved by those who knew him best. In his death the Weather Bureau loses one of its most gifted members, and the science of meteorology one of its most promising disciples.

THE PUBLISHED WORKS OF PROFESSOR MORRILL.

By the EDITOR.

In 1881 Gen. W. B. Hazen introduced new life into the service by securing the enlistment of young men of collegiate and scientific training. Mr. Morrill was among these and immediately after completing the course of instruction in signaling and meteorology at Fort Myer, Va., he was assigned to duty at the Johns Hopkins University for the purpose of maintaining a series of observations in atmospheric electricity under the special guidance of Prof. H. A. Rowland. The importance of this subject had been urged from a hygienic point of view by the American Climatological Association. A full account of his electrical work is given by Prof. T. C. Mendenhall, in his memoir of 1889, entitled A Report of Studies of Atmospheric Electricity, published in Volume V of the Memoirs of the National Academy of Sciences, Washington, 1891. Mr. Morrill's work at Baltimore included the establishment of a Mascart self-registering apparatus for atmospheric electricity, and he was the first to maintain such continuous record in this country; its importance was such that the complete record is published in the memoir by Mendenhall, pages 173–207. In 1878 Mr. Morrill was assigned to the station at Boston, and in that connection reestablished the Mascart apparatus at the Massachusetts Institute of Technology, where the record was maintained during the greater part of a year, until his departure for Paris. Mr. Morrill's work at Baltimore is highly spoken of in Professor Mendenhall's report. He, himself, published in Signal Service Note, No. 17, A first Report upon Observations upon Atmospheric Electricity at Baltimore. He also invented a mechanical collector to replace the Thompson water dropping collector, ordinarily used in connection with the Mascart apparatus, and which is fully described on pages 126 and 127 of Mendenhall's report. He

[1] The readers of the MONTHLY WEATHER REVIEW will scarcely need to be reminded that the works of A. Wilson, Ronalds and Birt, D. Archibald, William Eddy, A. McAdie, L. Hargrave, and others demonstrated the possibilities of kites for use in the study of meteorology of the free air at great heights some time before this work was taken up at Blue Hill. The employment of kites at the United States Weather Bureau stations was quite independent of the brilliant work done at Blue Hill or the recommendations of the International Committee. The advantages of kites over balloons are clearly stated by Prof. Willis L. Moore, Chief of the Weather Bureau, in Symons' Monthly Magazine for December, 1896, page 166.—ED.

also devised a flame collector for use in cold weather, as described on pages 128 and 129 of the same report.

In 1889 Mr. Morrill was delegated to represent the Signal Service at the Exposition Universelle at Paris, and his report on this subject, as published on pages 683–686 of the Annual Report of the Chief Signal Officer for 1890, shows his familiarity with physical apparatus.

In connection with his duties as Forecast Official, the question of the reduction of barometric measurements to sea level, for the purpose of drawing daily isobars, attracted his attention; the problem of a reduction appropriate to both mountains, and plateaus, and lowlands has always been a troublesome one, and yet vitally important for the United States. Mr. Morrill's review of the whole subject was thorough and excellent, and his resulting system or method seems to be a decided advance over any previously devised. He applied it also to annual charts as published in the MONTHLY WEATHER REVIEW for 1895, 1896, 1897, and it is now being applied also to the monthly isobars on Chart IV of the current REVIEW. He also constructed the isobars for higher levels, as published in the annual summaries for these years.

The current work on the prediction of floods in rivers was assigned to Mr. Morrill after the retirement of Prof. Thomas Russell, and this gave occasion for his monthly publication of summaries in the MONTHLY WEATHER REVIEW, as also the preparation of several annual volumes of daily rainfall and heights of rivers. His last work on the floods of the Mississippi is as creditable to him as it is to the Service.

DESTRUCTION BY LIGHTNING IN THE STATE OF NEW YORK DURING THE MONTH OF AUGUST, 1898.

BY ROBERT G. ALLEN, Section Director.

The month of August was remarkable for the almost daily occurrence of thunderstorms and for the violence and frequency of destructive lightning. The oldest citizens, who reported during July unprecedented losses by lightning, now report that the damage of this description during the month of August was far in excess of that reported in July, and that the storms on the 16th, 23d, and 24th were the most severe ever witnessed in this State.

The storms of the 23d were most violent in southeastern New York and in the upper Hudson Valley. The storms of the 24th were most severe through the eastern highlands and in the counties bordering on Lake Ontario.

Fourteen persons are reported to have been killed during the month; these reports are incomplete, and it is most probable that those instances reported are less than 50 per cent of the number of persons killed. Thunderstorms occurred on every day in the month, excepting the 11th and 20th, and destructive lightning occurred on the 1st, 2d, 3d, 4th, 5th, 7th, 8th, 9th, 12th, 14th, 15th, 16th, 17th, 18th, 22d, 24th, 25th, 26th, 29th, and 30th.

The storms of the 16th and 23d were more extensive and far more violent than those on any of the other dates mentioned, as will be seen by reference to the losses on the different dates given below.

It is probable that the losses reported herein are much less than the actual amount of such damages, as it has been almost impossible to obtain the information from all the localities visited by the severe electrical storms. It may be interesting to know that not one of the burned or injured buildings was provided with lightning rods, and that about 50 per cent of the buildings struck by lightning were located on dry upland. A majority of the barns burned contained the season's crops.

The difference between the number of barns burned (96) and the valuation of the property destroyed ($120,524) and the number of dwellings burned or injured (29) and the amount of damage ($3,276) is worthy of notice.

The following is a record of barns and houses burned or injured and the value of live stock killed during the month of August:

August 1.—One dwelling slightly injured.
August 2.—One residence, damage $18.
August 3.—Eight barns. $5,405; 1 dwelling, $1,900; stock killed, $260.
August 4.—Three barns, $4,650; 1 dwelling, $80; stock killed, $95.
August 5.—One barn, $600.
August 7.—One barn, $450.
August 8.—One church, $30.
August 9.—Stock, $35.
August 12.—Two dwellings, $313.
August 14.—One dwelling, $89.
August 15.—One barn, $1,000.
August 16.—Twenty-two barns, $21,160; 2 residences, $21; stock, $150.
August 17.—Thirteen barns, $18,520.
August 18.—One dwelling, $8.
August 22.—One barn, $850.
August 23.—Twenty-three barns, $42,908; 14 dwellings, $531; stock, $939.
August 24.—Sixteen barns, $16,976; 5 residences, $215; stock, $455.
August 25.—Stock, $17.
August 26.—One barn, $900.
August 29.—Five barns, $6,499; 1 residence, $100; electric car injured, $150, and 1 wheat straw stack burned, $40.
August 30.—One barn, $1,200.

Total number of barns burned or injured, 96; amount of damage, $120,524. Total number of dwellings burned or injured, 29; amount of damages, $3,276. Total value of stock killed by lightning, $2,060. One church struck and damaged to the extent of $30. One electric street car injured to the extent of $150. One wheat straw stack burned, value, $40. Total amount of all damages reported during the month of August, 1898, $126,081.

[The above list is accompanied by a map of the State of New York showing every locality where lightning struck during August. Not having the necessary blank maps for New York the Editor can not publish Mr. Allen's map in detail, but several features may be mentioned.

1. In general no records of lightning strokes can be expected from regions that are sparsely inhabited, therefore none are reported from the Adirondack region, and in fact but six from the whole northeastern third of the State of New York.

2. A belt of special frequency extends from Niagara Falls directly eastward to Albany. This evidently marks the rich farming track traversed by the New York Central Railroad and the canal. An area of special frequency occurs in the southeastern portion of the State, principally in Orange, Ulster, and Duchess counties.

3. In general the distribution of strokes over two-thirds of the State is so uniform as to lead one to believe that the same distribution would prevail over the northern third, if there were enough observers there present to take cognizance of them.

4. In general it is not the number of voluntary observing stations that controls the completeness of our records of lightning strokes, but the number of farmers with their dwellings and barns, and the activity of the local press reporters.

5. The special frequency of strokes in any small portion